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DOCKET NO. PHGB 000029

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Warwick

Application No.: 09/808,277

Filed: 03/14/2001

For: TRENCH-GATE SEMICONDUCTOR
DEVICES



Examiner: Rose, K.

Art Unit: 2822

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SEPARATE MARKUP SHEET

1. (Amended) A trench-gate semiconductor device, comprising:

a semiconductor body having an active cell area wherein trenches containing gate material extend into the semiconductor body from a surface thereof, wherein adjacent to each trench-gate there is a source region at said semiconductor body surface separated from a drain region by a channel-accommodating body region, and wherein a source electrode contacts the source regions on said semiconductor body surface; [characterised in that]

the active cell area has a network of connected said trenches with a said source region in each said cell;

trenches containing gate material extend from the network of connected trenches

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beyond the active cell area to an inactive area where said source regions are not present;

[and]

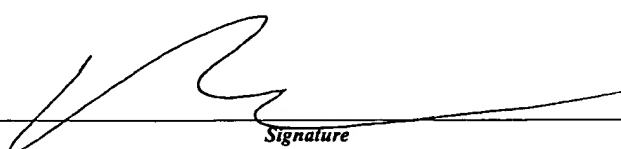
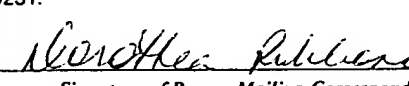
within said inactive area there is a gate electrode contact area where a gate electrode contacts the gate material on the whole area of the trenches adjacent the semiconductor body surface and where the gate electrode also contacts the semiconductor body surface adjacent the trenches; and

linking cells across the inactive and active areas, wherein each linking cell has a first region contacted by the gate electrode and a source region contacted by the source electrode.

5. (Amended) A semiconductor device as claimed in claim 4, modified in that at least some of said isolated cells in the inactive area which are nearest to the active area [are instead] comprise the linking cells across the inactive and active areas, wherein each linking cell [has a said first region contacted by the gate electrode, a source region contacted by the source electrode, and a said] further includes the underlying second region continuous with a said channel-accommodating body region which extends to the semiconductor body surface where it is contacted by the source electrode, the linking cells providing voltage protection diodes between the gate electrode and the source electrode.

6. (Amended) A semiconductor device as claimed in claim 3, wherein said trenches which extend from the network of connected trenches in the active cell area are stripe

shaped trenches which each extend completely across the gate electrode contact area, wherein the linking cells are provided across the inactive and active areas between the stripe shaped trenches, wherein each linking cell [has a said first region contacted by the gate electrode, a source region contacted by the source electrode, and a said] further includes the underlying second region continuous with a said channel-accommodating body region which extends to the semiconductor body surface where it is contacted by the source electrode, the linking cells providing voltage protection diodes between the gate electrode and the source electrode.

TRANSMITTAL LETTER (General - Patent Pending)			Docket No. PHGB 000029	
In Re Application Of: Warwick				
Serial No. 09/808,277	Filing Date 03/14/2001	Examiner Rose, K.	Group Art Unit 2822	
Title: TRENCH-GATE SEMICONDUCTOR DEVICES				
<p style="text-align: center;"><u>TO THE ASSISTANT COMMISSIONER FOR PATENTS:</u></p> <p>Transmitted herewith is: Amendment in 5 pages Separate Markup Sheet in 3 pages</p> <p>in the above identified application.</p> <p><input checked="" type="checkbox"/> No additional fee is required. <input type="checkbox"/> A check in the amount of _____ is attached. <input checked="" type="checkbox"/> The Assistant Commissioner is hereby authorized to charge and credit Deposit Account No. 14-1270 as described below. A duplicate copy of this sheet is enclosed.</p> <p><input type="checkbox"/> Charge the amount of _____ <input checked="" type="checkbox"/> Credit any overpayment. <input checked="" type="checkbox"/> Charge any additional fee required.</p> <p> Signature</p> <p>Ronald A. D'Alessandro Reg. No. 42,456 Hoffman, Warnick & D'Alessandro LLC Three E-Comm Square Albany, New York 12207 (518) 449-0044</p> <p>Dated: June 24, 2002</p> <div style="border: 1px solid black; padding: 5px;"><p>I certify that this document and fee is being deposited on June 24, 2002 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.</p><p> Signature of Person Mailing Correspondence</p><p>Dorothea Rubbone Typed or Printed Name of Person Mailing Correspondence</p></div>				

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